

REMARKS

Favorable reconsideration is respectfully requested.

The claims are 1 and 5-12.

The above amendment is responsive to points set forth in the Official Action.

In this regard, the features of claims 3 and 4 have been incorporated in above amended claim 1 and claims dependent thereon. Claim 11, directed to a method for formation of a pattern resist layer, has not been amended.

The significance of the forgoing amendments will become further apparent from the remarks below.

Claims 1-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al. (5,876,900) in view of Ohsawa et al. (6,440,634 B1).

This rejection is respectfully traversed.

The Official Action, in rejecting claims 3 and 4 (page 4, line 11 et seq. of the Action), takes the position that the Polymer 4 used in Example 10 of the Watanabe et al. reference may be encompassed by the definition of the resinous ingredient as component (A) previously recited in claims 3 and 4 by presenting a lengthy contention which, however, is untenable from established knowledge in polymer chemistry.

In this regard as shown by the set of unit formulas appearing at the bottom of the page for columns 25 and 26, firstly, Polymer 4 of Watanabe is a copolymer consisting of three types of the monomeric units in molar fractions indicated by the subscripts x, y and z ($x = 24\%$; $y = 4\%$; and $z = 72\%$).

In the absence of any statement that the Polymer 4 is a block copolymer, it is conventional in polymer chemistry to assume that the Polymer 4 is a random copolymer in which these three types of the monomeric units are distributed at random throughout the copolymer molecules in average molar proportions of $x:y:z$.

This means that the Polymer 4 can never be fractionated into two fractions relative to the molar proportion of the three types of the monomeric units including, for example, a first resin

fraction containing the monomeric units of the first type in a higher molar fraction than in a second resin fraction containing the first type monomeric units in a lower molar fraction than in the first resin fraction.

In contrast, according to claim 3 (which has now been incorporated into claim 1), the resinous ingredient as component (A) is a combination of two types of different resinous compounds (A1) and (A2) which are distinct from each other relative to the types of the pendant groups to the main chain structure of the copolymer molecules.

According to the definition in claim 3, namely, the first resin (A1) consists of two types of the monomeric units including hydroxystyrene units and alkoxyalkyl-substituted hydroxystyrene units while the second resin (A2) consists of, in addition to hydroxystyrene units, monomeric units selected from the group consisting of tertiary alkoxy carbonyl-substituted, tertiary alkyl-substituted and cyclic ether group-substituted hydroxystyrene units.

It is noted that none of the monomeric units of the above-mentioned types encompasses the substituted hydroxystyrene units constituting Polymer 4 of Watanabe. In short, Polymer 4 of Watanabe, which is a ternary random copolymer consisting of three types of different monomeric units, can never be a combination of two different resins (A1) and (A2), of which at least (A1) must be a binary copolymer consisting of two different types of monomeric units.

I never said that.

In view of the above unobvious distinction between the resinous ingredients of the present invention, i.e. component (A), from Polymer 4 of Watanabe, no one skilled in the art of photoresist compositions and informed of the Watanabe reference would be motivated to replace Polymer 4 of Watanabe with component (A) in formulation of a photoresist composition, without the benefit of the Applicants' own disclosure in this application, even if he were desirous of obtaining a photoresist composition improved in various properties described in paragraph [0001] of the present specification.

Claims 11 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe et al. in view of Ohsawa et al. as applied in claim 1 above, and further in view of Blakeney et al. (5,985,507).

This rejection is also respectfully traversed.

There is nothing in the cited references, alone or combined, which would teach combining these cited references in the manner set forth in the rejection, in the absence of the Applicants' disclosure. Thus, the claimed method is unobvious from the combined reference teachings.

The rejection is apparently based on inherency as can be seen from page 6, line 2 from the bottom of the Official Action. However, it is improper to base a rejection under 35 U.S.C. § 103 on inherency. *See In re Rinehart*, 189 USPQ 143 (CCPA 1976) at 145.

Lastly, the composition of Blakeney is very different from that of Watanabe and Ohsawa so the art skilled would not be motivated to combine them in the manner proposed by the rejection. Indeed the teachings of Blakeney are not general but are directed to the specific compositions disclosed therein.


Accordingly, the rejections on prior art untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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Version with Markings to Show Changes Made

1. (Amended) A positive-working photoresist composition which comprises, as a uniform solution in an organic solvent:

(A) 100 parts by weight of a hydroxystyrene-based polymer which is a combination of:

(A1) a first polyhydroxystyrene resin having phenolic hydroxyl groups a part of which are substituted for the hydrogen atoms thereof by acid-dissociable alkoxyalkyl groups; and

(A2) a second polyhydroxystyrene resin having phenolic hydroxyl groups a part of which are substituted for the hydrogen atoms thereof by acid-dissociable groups selected from the group consistent of tertiary alkoxy carbonyl groups, tertiary alkyl groups and cyclic ether groups, and

wherein the weight proportion of the first polyhydroxystyrene resin (A1) to the second polyhydroxystyrene resin (A2) is in range from 2:8 to 9:1;

[having phenolic hydroxyl groups or carboxyl groups as resinous base ingredient of which at least a part of the phenolic hydroxyl groups or carboxyl groups are substituted for the hydrogen atoms thereof by acid-dissociable groups;]

(B) from 1 to 20 parts by weight of a radiation-sensitive acid-generating compound;

(C) from 0.1 to 25 parts by weight of a polyvinyl ether compound susceptible to crosslinking;

(D) from 0.01 to 5 parts by weight of a carboxylic acid consisting of atoms of carbon, oxygen and hydrogen alone; and

(E) from 0.01 to 1 part by weight of an amine compound.

11. (Amended) A method for the formation of a patterned resist layer on the surface of a substrate which comprises the steps of:

(a) coating the surface of a substrate with the positive-working photoresist composition [defined in claim 1] which comprises, as a uniform solution in an organic solvent:

(A) 100 parts by weight of a hydroxystyrene-based polymer having phenolic hydroxyl groups or carboxyl groups as a resinous base ingredient of which at least a part of the phenolic hydroxyl groups or carboxyl groups are substituted for the hydrogen atoms thereof by acid-dissociable groups;

(B) from 1 to 20 parts by weight of a radiation-sensitive acid-generating compound;

(C) from 0.1 to 25 parts by weight of a polyvinyl ether compound susceptible to crosslinking;

(D) from 0.01 to 5 parts by weight of a carboxylic acid consisting of atoms of carbon, oxygen and hydrogen alone; and

(E) from 0.01 to 1 part by weight of an amine compound;

followed by drying to form a dried photoresist layer;

(b) exposing the dried photoresist layer on the substrate surface pattern-wise to light to form a latent image of the pattern;

(c) subjecting the photoresist layer after pattern-wise light exposure to a heat treatment;

(d) subjecting the photoresist layer to a development treatment with an aqueous alkaline solution as a developer to form a patterned resist layer; and

(e) subjecting the patterned resist layer to a heat treatment to effect diminution of the pattern size by thermal flow of the resist layer.